IN THE SPECIFICATION

Please amend the paragraphs of the specification as follows:

On page 1, paragraph 1001:

The present invention relates generally to communication systems, and more specifically to a method and an apparatus for estimating a reverse link maximum data rate and for estimating power required for transmission of [[a]] data at a rate of data in a communication system.

On page 1, paragraph 1002:

Communication systems have been developed to allow transmission of information signals from an origination station to a physically distinct destination station. In transmitting an information signal from the origination station over a communication channel, the information signal is first converted into a form suitable for efficient transmission over the communication channel. Conversion, or modulation, of the information signal involves varying a parameter of a carrier wave in accordance with the information signal in such a way that the spectrum of the resulting modulated carrier is confined within the communication channel bandwidth. At the destination station the original information signal is reconstructed from the modulated carrier wave received over the communication channel. In general, such a reconstruction is achieved by using an inverse of the modulation process employed by the origination station.

On page 1, paragraph 1003:

Modulation also facilitates multiple-access, i.e., simultaneous transmission and/or reception, of several signals over a common communication channel. Multiple-access communication systems often include a plurality of remote subscriber units requiring intermittent service of relatively short duration rather than continuous access to the common communication channel. Several multiple-access techniques are known in the art, such as ~~time division multiple access~~ Time Division Multiple Access (TDMA) and ~~a frequency division multiple access~~ Frequency Division Multiple Access (FDMA). Another type of [[a]] multiple-access technique

is a ~~code division multiple access~~ Code Division Multiple Access (CDMA) spread spectrum system that conforms to the "TIA/EIA/IS-95 Mobile Station-Base Station Compatibility Standard for Dual-Mode Wide-Band Spread Spectrum Cellular System," hereinafter referred to as the IS-95 standard. The use of CDMA techniques in a multiple-access communication system is disclosed in U.S. Patent No. 4,901,307, entitled "SPREAD SPECTRUM MULTIPLE-ACCESS COMMUNICATION SYSTEM USING SATELLITE OR TERRESTRIAL REPEATERS," and U.S. Patent No. 5,103,459, entitled "SYSTEM AND METHOD FOR GENERATING WAVEFORMS IN A CDMA CELLULAR TELEPHONE SYSTEM," both assigned to the assignee of the present invention.

On page 2, paragraph 1005:

In a multiple-access communication system, communications between users are conducted through one or more base stations. A first user on one subscriber station communicates to a second user on a second subscriber station by transmitting data on a reverse link to a base station. The base station receives the data and can route the data to another base station. The data is transmitted on a forward link of the same base station, or the other base station, to the second subscriber station. The forward link refers to transmission from a base station to a subscriber station and the reverse link refers to transmission from a subscriber station to a base station. Likewise, the communication can be conducted between a first user on one mobile subscriber station and a second user on a landline station. A base station receives the data from the user on a reverse link, and routes the data through a ~~public switched telephone network~~ Public Switched Telephone Network (PSTN) to the second user. In many communication systems, e.g., IS-95, W-CDMA, IS-2000, the forward link and the reverse link are allocated separate frequencies.

On page 3, paragraph 1006:

An example of a data only communication system is a ~~high data rate~~ High Data Rate (HDR) communication system that conforms to the TIA/EIA/IS-856 industry standard, hereinafter referred to as the IS-856 standard. This HDR system is based on a communication system disclosed in co-pending application serial number 08/963,386, entitled "METHOD AND APPARATUS FOR HIGH RATE PACKET DATA TRANSMISSION," filed 11/3/1997, now U.S. Patent No. 6,574,211, issued June 3, 2003 to Padovani et al., assigned to the assignee of the

present invention. The HDR communication system defines a set of data rates, ranging from 38.4 kbps to 2.4 Mbps, at which an ~~access point~~ Access Point (AP) may send data to a subscriber station (~~access terminal~~ Access Terminal, AT). Because the AP is analogous to a base station, the terminology with respect to cells and sectors is the same as with respect to voice systems.

On page 6, paragraph 1013:

There is a relationship between a transmission power and a rate of data to be transmitted. Communication systems, in general, do not allow an instantaneous change of rate of data. If a transmission channel link condition [[change]] changes, resulting in a need to change a transmission power and a data rate during the interval when a rate of data cannot be changed, the transmitted data may be erased. Therefore, there is a need in the art to estimate a rate of data that can be transmitted without an erasure under all channel conditions, or alternatively to estimate power required for transmission of [[a]] data at a rate of data.

On page 9, paragraph 1038:

FIG.1 illustrates a conceptual diagram of a communication system capable of performing maximum rate of data estimation in accordance with embodiments of the present invention. Various aspects of the maximum rate of data estimation will be described in the context of a CDMA communications system, specifically a communication system in accordance with the IS-856 standard. However, those of ordinary [[skills]] skill in the art will appreciate that the aspects of the maximum rate of data estimation are likewise suitable for use in various other communications environments. Accordingly, any reference to a CDMA communications system is intended only to illustrate the inventive aspects of the present invention, with the understanding that such inventive aspects have a wide range of applications.

On page 13, paragraph 1046:

Unlike the forward link, whose channels are always transmitted at full available power, the reverse link comprises channels, whose transmission is power controlled, to achieve the goal of maximized capacity of the communication system as explained above. Consequently, aspects of the maximum rate of data estimation will be described in the context of the reverse link.

However, as those of ordinary [[skills]] <u>skill</u> in the art will readily appreciate, these aspects are equally applicable to a forward link in a communication system, whose forward link is also power controlled.

On page 13, paragraph 1047:

The reverse link transmission power of the communication system in accordance with the IS-856 standard is controlled by two power control loops, an open loop and a closed loop. Conceptual arrangement of the open loop and closed loop is illustrated in **FIG. 3**. The first power control loop is an open loop control. The open loop generates an estimate of the reverse link quality metric in block **302**. In one embodiment, the quality metric is a path loss. The estimated path loss is then translated into a required transmit power (TxOpenLoopPwr) in accordance with other factors, e.g., a base station loading. In one embodiment, illustrated in **FIG. 4**, block 3**02** (of **FIG. 3**) comprises a filter **[[302]]** <u>**402**</u> filtering a received signal power RxPwr. The filtered RxPwr is provided to block **[[304]]** <u>**404**</u> together with a parameter K providing compensation for base station loading and translation to the TxOpenLoopPwr. In one embodiment, the block **[[304]]** <u>**404**</u> combines the filtered RxPwr and the parameter K in accordance with an Equation (1):

$$TxOpenLoopPwr = K - F(RxPwr) \qquad (1)$$

where F is the transfer function of the filter **[[302]]** <u>**402**</u>.

In one embodiment, the received signal is a signal received on a pilot channel. One of ordinary [[skills]] <u>skill</u> in the art recognizes that other embodiments of an open loop estimation process are well known the art and are equally applicable.

On page 14, paragraph 1048:

Referring back to **FIG. 3**, the function of the closed loop is to correct the open loop estimate, which does not take into account environmentally induced phenomena, such as shadowing, and other user interferences, to achieve a desired [[quality]] signal quality at the base

station. In one embodiment, the desired signal quality comprises a signal-to-noise ratio (SNR). The objective can be achieved by measuring the quality metric of a reverse link and reporting results of the measurement back to the subscriber station. In one embodiment, the base station measures a reference signal transmitted over the reverse link, and provides feedback to the subscriber station. The subscriber station adjust the reverse link transmission power in accordance with the feedback signal. In one embodiment, the reference signal comprises a pilot SNR, and the feedback comprises the RPC commands, which are summed in a summer **304** and scaled to obtain the required closed loop transmit power (TxClosedLoopAdj). Like the open loop, the closed loop is well known in the art and other known embodiments are equally applicable, as recognized by one of ordinary [[skills]] skill in the art.

On page 16, paragraph 1053:

As illustrated in **FIG. 7**, TxOpenLoopPwr is provided to a linear, time-invariant filter **[[7102]] 702**. In one embodiment, the filter **702** is a low pass filter. In another embodiment, the filter **702** has a transfer function $F_1 = 1$; consequently, the TxOpenLoopPwr is unaffected by the filter **702**. The TxOpenLoopPwr filtered by a filter **702** is provided to a filter **704**. In one embodiment, the filter **704** is a peak filter. The function of the peak filter is explained in reference to **FIG. 8.**

On page 16, paragraph 1055:

Referring back to **FIG. 6**, the TxOpenLoopPred is provided to a combiner block **610**. In one embodiment the combiner block **610** comprises a summer summing the TxOpenLoopPred with a prediction of the closed loop adjustment (TxClosedLoopPred), to yield a prediction of transmit pilot power (TxPilotPred). The predicted closed loop adjustment TxClosedLoopPred is estimated by providing [[a]] feedback signals for the closed loop to a block **606**. In one embodiment, the feedback signal comprises the RPC commands; consequently, the block **606** comprises a summer. The output of the summer represents the estimate of correction to the open loop estimated transmit power (TxClosedLoopAdj). The TxClosedLoopAdj is provided to a

block **608**. In one embodiment, the block **608** comprises a filter as described in reference to **FIG. 7**, i.e., an optional low pass filter **702** and a (non-optional) peak filter **704**. In accordance with one embodiment, the pre-determined decay rate of the peak filter **704** is 0.5 dB per a frame of signal. The peak filter is initialized as follows. One of the ATs and one of the APs establish a communication link using a predetermined access procedure, as part of which the RPC channel is established. Assuming that the RPC channel was established at time t_0 (referring to **Fig. 8**) the RPC commands are being provided to the block **608,** and consequently to the peak filter **704.** The TxClosedLoopPred (the Output signal of **Fig. 8**) is then initialized to the value of TxClosedLoopAdj (the Output signal of **Fig. 8**) at the time t_0.

On page 17, paragraph 1056:

Referring back to the block **610**, the TxPilotPred is provided to a combiner block **612**. Combiner block **612** also accepts a transmission power margin (TxPwrMargin). In one embodiment, (not shown) the TxPwrMargin is a constant, with default value of 3 dB. In another embodiment, the TxPwrMargin is dynamically adjusted by block **614**, in accordance with outage events. The method for dynamically adjusting the TxPwrMargin is described in detail below. Referring back to the combiner block **612**, in one embodiment, the combiner block **612** is a summer, consequently the output, a bounded transmission pilot signal (TxPilotUpperBound) is given by an Equation (3):

TxPilotUpperBound=TxOpenLoopPred+TxClosedLoopPred+TxPwrMargin (3)

The value of the TxPilotPred is, in general, different from the value of total transmit power required for transmission of a desired reverse link rate of data (rlRate). Consequently, the TxPilotUpperBound needs to be adjusted for the required rlRate. This is accomplished by translating the rlRate to a power in block **616**, and [[is]] <u>in</u> combining the result of the translation with the TxPilotUpperBound in a block **618** to yield the bounded total transmit power. A given rlRate is considered to be admissible if an Equation (4) is satisfied:

TxPilotUpperBound + PilotToTotalRatio(rlRate) < TxMaxPwr (4)

On page 18, paragraph 1057:

To optimize [[a]] performance of a communication system, it is desired that the highest data rate (rlRatePredicted), which is admissible (according to the Equation(4) is determined. Consequently, the TxTotalPwrUpperBound is compared with the maximum power available for transmission (TxMaxPwr) in block **620**. Thus, the block **620** evaluates the Equation (4). The result of the comparison is provided to a block **622**. If the Equation (4) is satisfied, the block **622** selects rlRate higher than the rlRate that has just been tested, provides the selected rlRate to the block **616**, and the process is repeated until the Equation (4) does not hold. The highest rate, for which the Equation (4) is satisfied is outputted as rlRatePredicted. One of ordinary [[skills]] <u>skill</u> in the art understands that the blocks **618 – 622** can be implemented or performed with a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. For the purposes of this document any of the above-enumerated options is referred to collectively as a processing block.

On page 21, paragraph 1064:

It has been discovered, that due to various methods for mitigating changing channel conditions, e.g., error correction, interleaving and other methods known to one of ordinary [[skills]] <u>skill</u> in the art, isolated slot outages in a frame do not result in packet decoding errors, however too many slot outages in one frame result in packet decoding errors. A design goal of a communication system is to limit the slot outage probability, to guarantee minimal performance degradation due to packet errors, while maximizing reverse link throughput under all channel conditions. From Equations (3), (4), (6) and (8) that increasing TxPwrMargin may reduce outage probability, while reducing TxPwrMargin increases the predicted reverse link data rate. In other words, a large value of TxPwrMargin provides a conservative estimate of the predicted reverse link data rate, resulting in lower user throughput and possibly, diminished reverse link capacity.

Therefore, in another embodiment, the value of TxPwrMargin is dynamically adjusted in accordance with changing channel conditions in order to maintain outage probability at the desired value.

On page 24, paragraph 1073:

Furthermore, in a specific case, when a path loss changes slowly the embodiment described in reference to **FIG. 6** can be further simplified as illustrated in **FIG. 10**, where the function of blocks **1002**, **1006**, **1008**, **1010**, and **1012** is the same as function of blocks **602**, **606**, **608**, **610**, and **612**. One of ordinary [[skills]] <u>skill</u> in the art recognizes[[,]] that moving the block **1012** to the closed loop branch did not change determination of TxPilotPredUpperBound because Equation (3) holds.